Prosthodontics

“Complete Dentures – Assessment of the Loose Denture”

Arek Dziedzic

DDS PhD

Postgraduate Student

University of Bristol

BS1 2LY

James Puryer

BDS DPDS MFDS RCS(Eng) MDFTEd MSc FHEA

Senior Clinical Teaching Fellow

University of Bristol

BS1 2LY

Tel: +44 (0)117 342 4184

Fax: +44 (0)117 342 4443

E-mail: james.puryer@bristol.ac.uk

Complete Dentures – Assessment of the Loose Denture

Abstract: Patients with complete dentures will often present to a clinician complaining that their dentures are loose. A careful history, clinical examination and denture examination is needed so that the cause of their loose dentures can be determined. Only once a suitable diagnosis has been reached can an appropriate treatment plan be developed. This paper aims to guide readers through this history and examination process to help them formulate a suitable diagnosis before embarking on any potential treatment options.

Clinical Relevance: The paper provides a guide as to how to assess an edentulous patient presenting with loose complete dentures.

Objectives: The reader should understand how to assess a patient complaining of loose complete dentures to formulate an appropriate diagnosis and subsequent treatment plan.

Introduction

The proportion of the UK population who are edentulous has fallen over recent years from 30% in 1978 to 6% in 2009.[1] Despite this encouraging trend, the UK still has The article is about assessing the complaint of a loose denture it involves assessment of the patient and the prosthesis not solely the denture(s)many edentulous patients, and these patients are generally older, more medically compromised and more of a challenge to treat than previously. To treat these patients successfully, clinicians are therefore in need of greater levels of experience, clinical skills and management of patient expectations.

Patients naturally expect their dentures to fulfil certain basic criteria in that they want them to be:

- Comfortable
- Retentive
- Stable in function
- Aesthetically pleasing

Failure to achieve any of these criteria can lead to patient dissatisfaction, and one of the most common 'post-insertion' complaints is one of loose dentures.[2-4] Before embarking upon remedial treatment, a thorough structured patient history needs to be taken, along with careful examination of the patient's oral cavity and existing dentures. Without this, a differential diagnosis as to the cause of the loose dentures is unlikely to be established nor a suitable treatment plan formulated.[5] The aim of this paper is to guide readers through this history and examination process so that an appropriate diagnosis and treatment plan can be made.

Denture support

A well-supported denture will have resistance to movement into the denture-bearing tissues.

Denture stability

A stable denture exhibits resistance to movement laterally or antero-posteriorly, and thus does not rock or move sideways, forwards or backwards.

Denture retention

A retentive denture is one that will show resistance to vertical movement away from the denture-bearing area.

For a denture to be retained, the total retentive forces acting upon a denture must outweigh the total displacing forces (Figure 1).[2,6] Various factors will affect these forces and are summarised in Table 1. Some of these factors will be related to the patient, whilst some will be related to the construction of the dentures.

Underlying medical conditions

A large proportion of edentulous patients are elderly and/or frail, usually having a complex medical history. These underlying medical conditions and associated polypharmacy may result in xerostomia and impaired saliva production.[2] This in turn may have a detrimental effect on denture retention as the cohesion forces between the oral mucosa and the fitting surface of denture deteriorate.[7] The various causes of xerostomia are summarised in Table 2.

Aging, neurological disease, dementia, degenerative muscular diseases, strokes and cerebrovascular accidents may all compromise a patient's ability to control their dentures. Inelasticity of cheek tissues is often a result of aging and can be associated with scleroderma and submucous fibrosis.[8]

Patient may have suffered from neoplastic disease of the oral cavity with the ensuing surgical treatment and the effects of chemo-radiotherapy leaving them with significantly affected oral anatomy and reduced support, stability and retention of dentures.

Psychogenic factors

Some patients can be very sceptical with regards to wearing dentures and they often compare their dentures to those of others, suggesting that their friends or family members have 'much better fitting dentures' and that they never have any problems. These patients are often unable to understand that everyone is very individual and has different anatomical edentulous ridges and oral environment. Edentulous patients who wear a new set of complete dentures need to develop and learn so called 'oro-motor skills' or 'denture-wearing skills', stabilising their dentures during routine functional activities. In some cases, patients cannot tolerate very well-designed and constructed dentures, whilst others are able to cope with complete dentures reasonably well, despite their severely compromised alveolar ridge morphology and poor denture-bearing foundation.[3] For those patients who have not yet accepted their edentulous state, a favourable outcome is doubtful.[6] Furthermore, patients found to suffer from neuroticism tend to be less satisfied with their dentures than non-neurotic patients.[9] In addition to having good clinical and technical skills, a

successful outcome may be helped by having insight into patient behavior and psychology.[10]

Patient expectations

These must be managed throughout treatment, although this may be difficult due to specific individual health issues.[11,12] Good communication allows for better patient co-operation during treatment and minimises the risk of non-justified or 'irrational' complaints, including those post-insertion of dentures.[10,13] It must be stressed to patients receiving new complete dentures that time will be required to achieve new oral motor skills whilst chewing and speaking.[14] A successful outcome following construction of new dentures depend upon many factors including those related to the patient and those related to the skill of both the clinician and the technician constructing the dentures.[2,15]

Patient history

The patient history should follow the accepted protocol which will include the presenting complaint and history, medical history, dental history, denture history and social history.[15] Often, a patient needs to be encouraged to express all concerns and problems related to their dentures, and they should be recorded in the patient's own words. If a patient reports numerous complaints, it can be prudent to ask the patient to prioritise which complaint is the most important. Appropriate questions to ask [2,3,6] during this history taking process and their relevance are shown in Table 3. A 'diagnostic discussion' facilitates the information about an appropriate treatment plan that aims to satisfy the patient's expectations.[16-18] It must be remembered that to achieve the construction of a satisfactory set of dentures, technical, biological and

physiological inter and intra-related factors between the patient and dentist must be considered.[19]

Patient examination

A thorough extraoral examination with the patient wearing their existing dentures should be carried out prior to an intraoral examination and an assessment of the dentures themselves. Information that can be gained from this extraoral examination will include:

- The skeletal base, disproportion of the maxilla and mandible and whether the patient has a class II or a class III tendency (Figure 2).
- Facial expressions and signs of poor muscle control due to, for example cognitive impairment, stoke or cerebrovascular accident
- Vertical dimension with the patient in occlusion and with the mandible at rest. Is the patient ‘over-closed’ or ‘propped open’?
- Lip competence and signs of poor upper anterior tooth position affecting the bulk and prominence of the lips and the naso-labial angle
- Range of movement of the TMJ and any evidence of trismus
- Atrophy or poor control of the muscles of mastication
- Lymphadenopathy

An intraoral examination should then be carried out, both with and without dentures in the mouth. When assessing the dentures in-situ, this should be carried out with the patient wearing each individual denture and then with the patient wearing both dentures together. Information that can be gained from the intra-oral examination will include:

- The quality of the alveolar ridges, bony morphology, degree of resorption or atrophy and evidence of recent extractions
- The quality of the oral mucosa overlying the bony ridges including its thickness and its displaceability
- The presence of any anatomical variations or pathology including the presence and extent of ‘flabby’ ridges, bony prominences or tori, high frenal attachments, denture induced hyperplasia, denture stomatitis, ulceration or other pathology (Figure 3)
- The retention of the upper and lower denture. Check if the upper denture drops or the lower denture ‘floats up’ when the patient opens their mouth. If the dentures remain in-situ, try to pull the dentures vertically away from the denture bearing mucosa by grasping the anterior teeth with thumb and forefinger (Figure 4).
- The stability of the upper and lower dentures. Try to destabilise the upper denture by applying a sideways and upward pressure in the canine region (Figure 5). Check if the lower denture is destabilised by the lower lip and whether the anterior teeth are set too far forward of the neutral zone. This may be pronounced in patients who have strong mentalis muscles and significantly resorbed alveolar ridges.[6,16] Check that the lower denture is not destabilised when the patient sticks out their tongue or moves it from side-to-side. This may be evidence of an overextended lingual flange.
- The position of the occlusal plane. The tongue should rest above the occlusal plane to stabilise the lower denture.
- The support provided to the dentures and the adaptation of the dentures to the underlying tissues (Figure 6). Dentures that have a larger fitting surface area

tend to have more support than those with a smaller fitting surface area. Support is also better provided by firm, resilient and keratinized tissues of uniform thickness that are well- attached to underlying bone. Apply pressure to the dentures towards the supporting tissues to check for undesired movement.

- The peripheral extensions to determine if these are overextended or underextended and whether the upper posterior border extends to the vibrating line (Figure 7). Check that the peripheral borders of the dentures extend to the reflection of the sulci without interfering with the tissues of the lip, cheek or floor of mouth.
- Interferences with labial, buccal or lingual frena.
- The vertical dimension and the presence or absence of a freeway space and if present, is it excessive? The freeway space is the difference between the occluding face height and the resting face height when the patient is wearing both upper and lower dentures. The freeway space should be in the region of 2-3mm and can be assessed using either a Willis bite gauge or a pair of dividers and ink dots on the patient's nose and chin.
- The presence of a bilateral balanced occlusion and if there are any occlusal discrepancies such as premature contacts, crossbites, anterior or posterior open bites (Figures 8 and 9).
- The quantity and quality of saliva and signs of hyposalivation or xerostomia.

Finally, an assessment of the dentures themselves should be carried out (Figure 10).

- Check the fitting surfaces and denture base. Sometimes having a 'too detailed' fitting surface can be disadvantageous in cases with severely flabby ridges or where the lower denture is not sitting in a stable position as these irregularities may irritate the oral mucosa.

- Checking the polished surfaces for appropriate contour and occlusal surfaces for signs of excessive wear or parafunctional habits
- Check flanges and their extensions for any missing or fracture portions
- Check to see if there is evidence of repairs, relines or additions
- Check denture hygiene

Diagnosis

Following this examination, a clinician should have sufficient information from which to make a diagnosis. It is good practice to base this diagnosis upon the main problem responsible for the denture looseness. For example, “Loose upper denture due to under-extension of flanges and a poor peripheral seal”, or “Loose lower denture due to teeth being set too far anteriorly and not within the neutral zone”. This will help guide the clinician in formulating a suitable treatment plan that will hopefully overcome the current problem. Various treatment strategies may then be used:

- Acceptance of the current dentures and use of a fixative
- Relining or rebasing the dentures
- Provision of new dentures using a conventional technique
- Provision of new dentures using a modified copy or template technique where controlled changes are introduced
- Provision of implant-supported prostheses

Conclusion

The assessment of an edentulous patient complaining of loose dentures requires a comprehensive history and examination along with sound communication between clinician and patient. This will allow an appropriate diagnosis to be made before a

suitable treatment plan is formulated. It is hoped that this paper will help to provide structure to this history taking and examination process, such that a successful treatment outcome for both patient and clinician is more likely.

Conflicts of interest: The authors have no conflicts in interests to declare.

References:

1. Fuller E, Steele J, Watt R, Nuttall N. Adult Dental Health Survey – England, Wales, Northern Ireland 2009
2. McCord JF, Grant AA. Identification of complete denture problems: a summary. British Dental Journal 2000; 189(3): 128-134.
3. Scott BJ, Hunter RV. Creating complete dentures that are stable in function. Dent Update 2008; 35(4): 259-262, 265-267.
4. Piampring P. Problems with Complete and Related Factors in Patients in Rajavithi Hospital from 2007 to 2012. Journal of the Medical Association of Thailand 2016; 99 Suppl 2: S182-7.
5. Nayar AK, Bell RA, Contreras J. Management of post-insertion problems in complete denture treatment. Part I: Problems related to poor diagnosis, treatment planning and biomechanical phase of denture construction. Journal of the Maryland State Dental Association 1984; 27(2): 58-64.
6. McCord JF, Smith P, Jauhar S. Complete dentures revisited. Dental Update 2014; 41(3): 250-252, 255-256, 259.
7. Chen MS, Daly TE. Xerostomia and complete denture retention. Journal of Oral Health 1980; 70: 27-29

8. Verma M, Gupta A. Post insertion complaints in complete dentures – A never ending saga. Journal of Academy of Dental Education 2014; 1: 1-8
9. Felon MR, Sherriff M. Newton JT. The influence of personality on patients' satisfaction with existing and new complete dentures. Journal of Dentistry 2007; 35: 744-748.
10. Carlsson GE. Clinical morbidity and sequelae of treatment with complete dentures. Journal of Prosthetic Dentistry 1998; 79(1): 17-23.
11. Friel T. The 'anatomically difficult' denture case. Dental Update 2014; 41(6): 506-508, 510-512.
12. Clarke P, Leven AJ, Youngson C. Managing the Unstable Mandibular Complete Denture – Tooth Placement and the Polished Surface. Dental Update 2016; 43(7): 660-662, 664-666, 669-670.
13. Freeman R. The psychology of dental patient care - 9. Communicating effectively: some practical suggestions. British Dental Journal 1999; 187(5): 240-244.
14. Celebic A, Knezovic-Zlataric D, Papic M, Carek V, Baucic I, Stipetic J. Factors related to patient satisfaction with complete dentures. The Journals of Gerontology 2003; 10: 948-953.
15. Allen PF, McMillan AS. A review of the functional and psychosocial outcomes of edentulousness treated with complete replacement dentures. Journal of the Canadian Dental Association 2003; 69(10): 662.
16. Allen PF, McCarthy S. Complete Dentures: From Planning to Problem Solving. 1st Edition, Surrey: Quintessence, 2003

17. LaBarre E, Giusti L, Pitigoi-Aron, G. Addressing problems in complete dentures. Compendium of Continuing Education in Dentistry 2007; 28(10): 538-540.
18. Critchlow SB, Ellis JS, Field JC. Reducing the risk of failure in complete denture patients. Dent Update 2012; 39(6): 427-430, 433-434, 436.
19. Berg E. Acceptance of full dentures. International Dental Journal 1993; 43: 299-306.

Figure 1: For a denture to be retentive, the overall retentive forces must outweigh the overall displacing forces. Examples of these forces are included in this illustration.

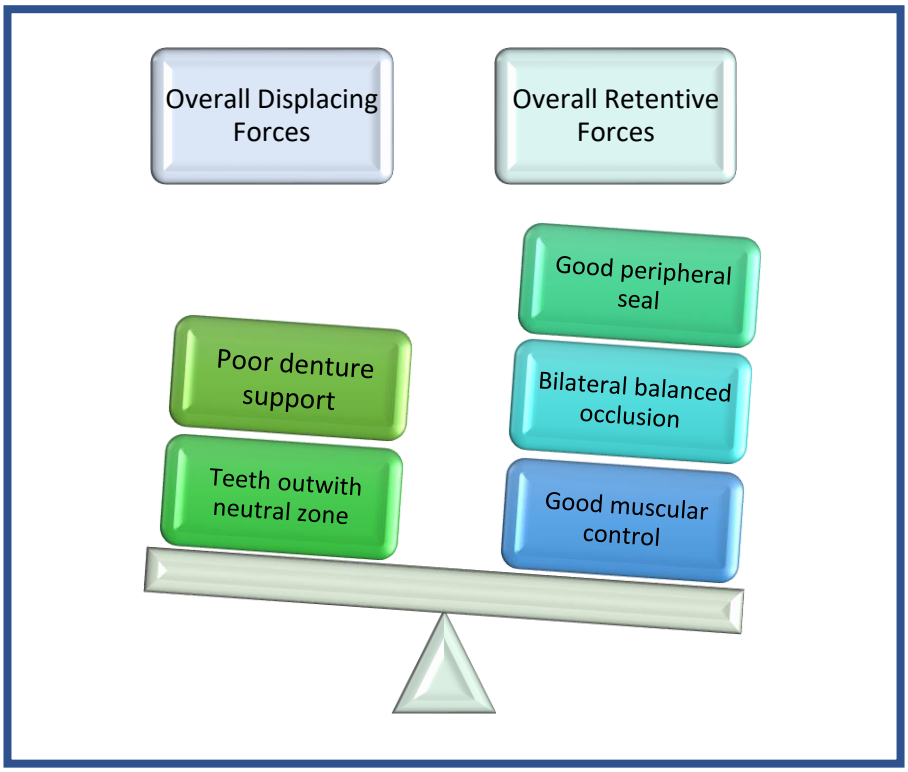

Figure 2: A patient with a habitual or postural prognathism with a large amount of wear visible on the occlusal surfaces of both upper and lower dentures, rather than a true skeletal class III pattern.

Figure 3: Assessment of the edentulous ridges may reveal pathologies, for example, carious retained roots. Following their extraction, resorption will most likely reduce both support and stability for the denture. Note the existing shallow anterior sulcus and prominent buccal frenal attachment.

Figure 4: Assess the retention of the upper denture by grasping the anterior teeth with thumb and forefinger and trying to pull the dentures vertically away from the denture bearing mucosa.

Figure 5: Assess the stability of the upper denture by trying to destabilise it from its seated position. This is achieved by applying a sideways and upward pressure in the canine region.

Figure 6: When the dentures have good adaptation to the supporting tissues and the correct peripheral extensions, the soft tissues of the cheek and tongue will help to stabilise and retain the dentures in-situ. The polished contour is also important to ensure that the buccinators rest against an appropriately contoured buccal flange and ensuring that there is no lingual ‘overhang’.

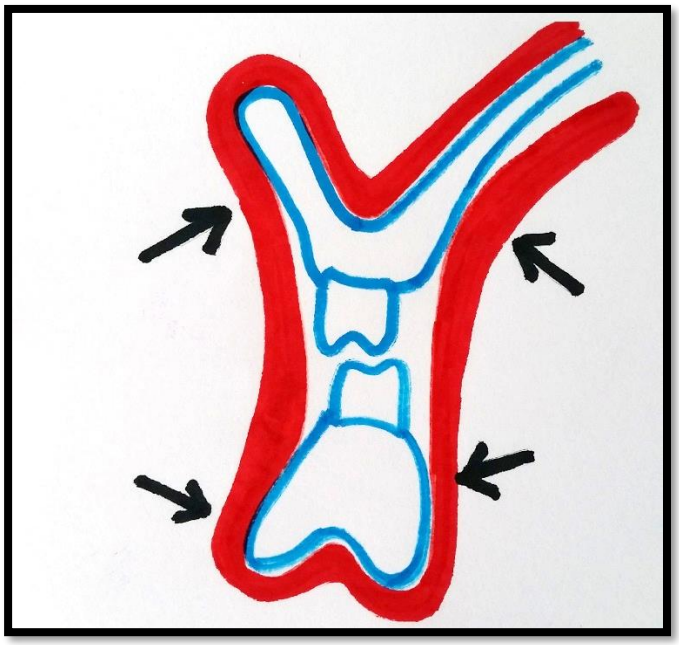

Figure 7: Assess the peripheral extensions of the denture. In this case, the flange in the upper left quadrant is overextended and displaces the soft tissues. As a result, the soft tissues tend to displace the denture from its seated position.

Figure 8: In this example, a bilateral balanced occlusion has not been achieved and a premature contact exists between the upper and lower first premolar teeth as well as there being an inadequate posterior occlusion. Both these factors will reduce denture stability in function.

Figure 9: A lack of lower posterior teeth can reduce the stability of the upper denture in function. Note the lateral spread of the tongue which may make the provision of a lower partial denture more difficult for the patient to tolerate.

Figure 10: Assess each individual denture out of the mouth. In this example, there is no anterior flange, compromising denture retention. Note the poor denture hygiene and evidence of previous repaired fractures.

Table 1: Factors affecting the looseness of complete dentures

Factors that decrease retention
• Denture borders being under-extended or having too little width • Inadequate peripheral seal • Inadequate post-dam • Prominent frenal attachments • Decreased muscle control due to ageing, weight loss, dementia and other neurological disorders • Highly resorbed residual ridges • Xerostomia and decreased saliva production • Denture borders being over-extended • Polished surfaces being set outside of the 'neutral zone' • Thickened lingual flange • Weight of an upper metal baseplate
Factors that decrease stability
• Non-resilient supporting soft tissues • Fibrous tissue in denture-bearing areas • Bony prominences (tori) displacing dentures • Occlusal plane not orientated correctly • Occlusal plane not being at correct vertical position • Incorrect size/shape of posterior teeth • Teeth being placed too far from residual ridge • Mandibular molars placed too far posteriorly • Lack of freedom of movement in ICP • Thickened upper and lower labial flanges • Lack of OVD or excessive OVD • Poor perception of patient to wearing dentures

Table 2: Causes of xerostomia

- Increasing age
- Medications
  - Antidepressants
  - Antihypertensives
  - Opiates
  - Bronchodilators
  - Proton pump inhibitors
  - Antipsychotics
  - Antihistamines
  - Diuretics
  - Antineoplastic drugs
- Sjogren’s syndrome
- Sicca syndrome
- Radiation therapy
- Anxiety
- Dehydration

Table 3: Appropriate questions to ask during the dental and denture history

Question	Relevance
Why are you unhappy with these dentures?	To focus on the main presenting complaint
Does the upper denture drop down?	As well as errors with the peripheral fit, there may be issues with the post-dam or issues with support
Is the problem worse when talking or eating	This may indicate an issue with the peripheral extension, the occlusion or support
Do you need to use a fixative to keep the dentures in?	This may highlight the severity of the problem and give insight into patient expectations
How long have you had this problem?	To find out whether patient was dissatisfied with the dentures since they were fitted, or whether that problem has occurred recently
How old is this set of dentures?	Patients habituated to a set of dentures for many years may not adapt to changes so easily. A copy technique may be considered
Were these current dentures ever satisfactory?	If not, this may allude to poor construction or to high expectations of patients
For how long you have you been edentulous?	The length of time edentulous may relate to the amount of ridge resorption
Have you ever had any dentures before, and if so, were they better fitting?	This again may allude to poor construction or to high expectations of patients
How many previous sets of dentures have you had?	This may allude to either rapidly changing and resorbing ridges or to high patient expectations
Were these dentures fitted immediately following teeth extractions?	There may have been rapid resorption of bone following these extractions
When you are not eating, do you feel that the dentures rest together or apart?	This may indicate errors with the OVD and lack of FWS
Does your mouth feel dry?	Xerostomia can have an impact on denture retention
Do the dentures make you ‘gag’?	An increased gag response may affect formulating the overall treatment plan